

NOTES ON AUSTRALIAN DIPTERA. No. xii.

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(Communicated by Dr. I. M. Mackerras.)

(Two Text-figures.)

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In this part of the series of papers which I have been intermittently presenting I include some data upon the family Tachinidae which may be of interest to students of the group who intend to take up a more intensive survey of these interesting and, in some cases at least, valuable economic species.

The group appears to be a comparatively recent one, and, as in most such groups, the generic and specific limits are not as sharply drawn as in the older groups, and there is a greater diversity of characters, with a corresponding lack of distinctness in some of these, than is present in more definitely established groups and species. It is to be regretted that much of the work already done has been based upon rather trivial and variable characters, and, in addition to that, practically all of it done outside of Europe has been grafted upon the basis supplied by earlier work upon the fauna of that continent, and without considering either the fauna of the world as a whole or that of each particular faunal region as a separate unit. Consequently many of the species described as belonging to particular genera do not belong to, and are often quite distinct from, the genera they were originally placed in, having been relegated to their generic position without a proper consideration of many important characters, because of a lack of knowledge of the groups and their characters. Even the major groups which have in many cases been accepted as of family and subfamily status are not entitled in most cases to such distinction, and herein I include in the family the group Dexiidae of authors, and such concepts as Rutiliinae, etc., limiting the family as follows: Hypopleura with distinct bristles in one or more series below the spiracle, or adjacent to it; postscutellum quite prominently convexly developed immediately below the scutellum; lower calypter always much larger than upper; none of the abdominal sternites overlapping sides of tergites on their entire length. Usually the small knob-like protuberance immediately in front of and below base of wing is inconspicuous, but in some of the groups it is as prominent as in Muscidae.

There are a number of groups which may be accepted as subfamilies or tribes, such as Dexiinae, Rutiliini, Phasiinae, etc., and hereinafter I deal with one segregate which has been accorded tribal rank by Townsend and the present writer, and which is essentially Oriental and Australasian so far as I am at present aware.

The figures which I presented in my recent paper (These PROCEEDINGS, 1927) on the Australian Calliphoridae will be found useful in the study of this family also, most of the characters shown therein being used here also.

Tribe Palpostomini.

This group is distinguished from its allies by the following combination of characters: Scutellum with four strong bristles; prosternum setulose; lower calypter narrow, rounded at apex, and standing well clear of lateral basal angle of scutellum, its inner basal portion straight; third wing vein ending in costa close to apex of wing; first wing vein bare; central portion of upper occiput with two groups of short black setulae on lower half or more; palpi well developed. The proboscis may or may not have the apical labellae separated and palp-like.

There are three genera at present known to me, two of them occurring in Australia. I give below a key for their recognition.

Key to the Genera.

1. Centre of propleura with setulose hairs *Eustacomylia*, n. gen.
Centre of propleura bare 2
2. First posterior cell of wing usually closed and distinctly pedunculate, rarely closed at extreme margin of wing *Palpostoma* Robineau-Desvoidy
First posterior cell of wing distinctly open in margin of wing
..... *Ochrameigenia* Townsend

Genus OCHROMEIGENIA Townsend.

There is but one described species of this genus, *ormoioides* Townsend, which occurs in the Orient and is parasitic upon beetles.

Genus EUSTACOMYIA, n. gen.

This genus is very similar to *Ochrameigenia*, having the first posterior cell of wing open, but it differs from both the other genera in having the central part of the propleura with numerous setulose hairs, and the setulae on base of third vein confined to the node both above and below, instead of only below. In addition to these characters the parafacial is wider, being noticeably wider below than is the third antennal segment, and the arista is much shorter, being barely as long as antennae, and more thickened on basal half, with almost indistinguishable pubescence. Genotype, *Eustacomylia breviseta* Malloch. Named in honour of the late Dr. Eustace W. Ferguson, who submitted the material.

EUSTACOMYIA BREVISETA, n. sp.

Male.—Head yellowish ochreous, occiput, ocellar spot, frontal orbits, and parafacials, fuscous, with grey dusting, third antennal segment and arista fuscous, palpi ochreous. Thorax fuscous, more yellowish on humeral angles and apex of scutellum, the surface with changeable grey dusting, mesonotum with four linear black vittae, which are interrupted at suture and cease behind middle, and a blackish mark laterad of these on each side at suture, all of which are best seen when the thorax is viewed from behind; metanotum greyish dusted. Abdomen ochre-brown, with a darker central vitta, and dots at bases of the hairs and bristles, the anterior and posterior margins of tergites pale grey dusted. Legs ochreous yellow, fore and hind femora, and apices of tarsi, infuscated. Wings slightly smoky. Calyptres pale brownish. Halteres dusky yellow.

Frons at anterior ocellus fully as wide as third antennal segment and about half as wide as height of cheek, vertical and ocellar bristles very short, orbits with a series of short bristles along inner margins, and short setulose hairs laterad of these which are continued downward over parafacial in about six series, the parafacial at middle about 1.5 as wide as third antennal segment,

the latter fully twice as long as second segment; arista thickened to about middle, almost bare; cheek about one-third as high as eye; vibrissae short, with numerous black bristles adjacent to them; proboscis without differentiated apical processes. Thoracic dorsum with the hairs longer and stronger than in *Palpostoma*, the presutural acrostichals as long as the dorsocentrals, in other respects as in that genus. Tibial bristles rather weak. First posterior cell narrowly open.

Length, 6 mm.

Type, Sydney, N.S.W., December 16, 1923.

Genus PALPOSTOMA Robineau-Desvoidy.

This genus is known only from Australia and Tasmania, and was originally placed in the heterogeneous assemblage "Muscidae Testacea" by its describer, but has little in common with most of the other genera therein included, these being mostly Calliphoridae, the only character they had in common being their testaceous yellow colour.

Aldrich in 1922 dealt with the genus, briefly redescribed the two known species, and added one new one.*

I have examined his material and, having a number of additional specimens as well as some new data upon the genus, I present some notes herewith.

In redefining the genus Aldrich gave a comprehensive description of the thoracic bristling, which unfortunately does not apply in all respects to the material I have examined, there being in at least one species more than two prosternal bristles, in nearly all specimens there are two intra-alars, and the posterior mesopleural bristles are more than four in number. It is also noteworthy that the palp-like apical labellae of the proboscis are not always conspicuous, there being specimens in which they are even undivided, or almost so.

It is extremely difficult to decide from the material now in my hands exactly how many species are represented, as some are from widely separated localities from those that yielded others, and there is but one sex represented from certain of those localities. No taxonomist is more ready to admit than I am the dangers attendant upon the elucidation of species from a small amount of material, and without a knowledge of the habits, or biology, of a species, or the circumstances of its occurrence in nature, and were I to attempt the presentation of complete data upon this material I fully realize that there would be considerable risk of falling into error in my conclusions as to specific distinctions, so I refrain from making a complete survey pending receipt of further accessions.

One of the specimens before me appears to represent a species quite distinct from any of the three in Aldrich's material and is described below. In addition to it there are apparently four other species in my possession, one of these is represented by 10 specimens, all taken in Sydney, N.S.W., and appears to be distinct from the form accepted by Aldrich as *testacea* Robineau-Desvoidy, though it seems to be even more likely to prove the true *testacea* than the other one. Two females from Sydney belong either to two distinct species, or if they belong to but one they present an unusual dimorphism, one having the frons very little wider at anterior ocellus than the distance across the posterior ocelli and not as wide as third antennal segment, while the other has it twice as wide as either of these standards. The genus appears to me to present an interesting field for study by some person having access to the insects in their natural

* *Proc. U.S. Nat. Mus.*, 1922, lxii, art. 11, pp. 2-5.

surroundings; any decisions based upon material such as I have, and under laboratory conditions, must of necessity be largely conjectural.

In a paper published recently in the *Philippine Journal of Science*, Townsend has erected the genus *Pseudopalpostoma* for the reception of *Palpostoma desvoidyi* Aldrich. This genus is absolutely uncalled for, as none of the characters cited for its distinction are absolute, and some of them, such as the single strong median marginal bristle on the second apparent abdominal tergite, are abnormal. Every student who has a desire to keep systematic entomology on a practical basis must deprecate this erection of illusory genera, and especially in faunal regions which are *terra incognita* to the worker who merely dabbles in inventions, without aiding either beginners or those who are really versed in the taxonomy of the group. The literature of this family is in worse condition than that of any other, and unless one is prepared to disregard most of it and proceed with his work along conservative lines he must perforce devote a tremendous percentage of his time to untangling the figments of imagination tendered as serious contributions to our knowledge of the family since the latter part of the last century.

PALPOSTOMA APICALIS, n. sp.

Female.—Shining fulvous-testaceous. Ocellar spot and a streak on each side of occiput above blackish; frontal orbits and upper part of parafacials slightly infuscated, and, like the face, white dusted; third antennal segment brown except at base. Thorax without evident dorsal dusting. Abdomen fuscous and with rather dense brownish dusting on apical three tergites, the basal tergite entirely fulvous-testaceous. Apices of mid and hind femora blackened above, the mid pair least distinctly so and to a lesser extent. Wings hyaline. Calyptrae and halteres yellow.

Frons at vertex about one-fifth of the head width, about twice as wide as third antennal segment, and three times as wide as distance across posterior ocelli; the forwardly directed upper orbital bristles and the ocellars very weak, the four verticals well developed; third antennal segment over three times as long as second and not as wide as half the height of cheek; arista subnude; cheek fully one-third as high as eye. Thoracic dorsum more sparsely haired than usual, the bristles fine but distinct, anterior intra-alar short. Legs slenderer than usual, the tibial bristles all short and weak, none on anterodorsal surface of fore pair. No evident bristles at apex of fourth abdominal tergite. First posterior cell closed in margin of wing, not petiolate.

Length, 5.5 mm.

Type, Woy Woy, N.S.W., September 22, 1923 (Mackerras).

A rather slender and weakly bristled species, distinguished from any known to me by the dark apices to the mid and hind femora. I hope to obtain enough material to deal further with the genus at some future time.

I have been unable to decide just what group to place the following genus in, but the evident though short hairs on the arista would apparently indicate that it is dextine in its affinities. There are several Oriental species allied to the one now dealt with, but these cannot be completely described here.

Genus *SEMISUTURIA*, n. gen.

Generic characters.—If one considers the very short haired arista as indicating group affinities, this genus runs to *Morphomyia* Rondani in Williston's

key to the genera of Dexiinae of North America. A comparison with the genotype, *tachinoides* Fallen, shows many points of resemblance, but the abdominal tergites in the new genus are not separated by distinct sutures except laterally, while in *Morphomyia* and other genera known to me the sutures dividing the tergites are complete. If, on the other hand, one disregards the short arisal hairing as of no value in indicating group relationships, and assigns the genus to Tachininae, the genus will run to *Oestrophasia* in the same manual, but here the same character as above indicated will suffice for its recognition. A summary of the characters of the new genus is as follows: Arista very short haired; eyes with sparse microscopic hairs; face without a vertical carina; antennae in profile inserted close to middle of eyes; cheek not one-third of the eye height; vibrissae situated a little above mouth margin, some bristles above them; parafacial bare; proboscis short; palpi well developed. Thorax with 2 or 3 + 3 dorsocentral bristles, 1 or 2 + 2 acrostichals; only two bristles on presutural area, the posterior sublateral lacking; postsutural intra-alars two pairs; prosternum, propleura, postalar declivity, and metanotum, bare; sternopleurals 1 + 1; posterior spiracle with pronounced posterior flap. Abdomen ovate, or elongate ovate, the tergites apparently fused centrally; a pair of macrochaetae on middle of hind margin of each tergite except on first in two species. Costal thorn present; inner crossvein well before apex of first vein; bend of fourth vein subangular; first posterior cell open, its apex quite close to wing tip; third vein setulose at base; other veins bare; lower calypter lobulate at base on inner margin and lying close to scutellum. Genotype, *Semisuturia australis*, n. sp.

SEMISUTURIA AUSTRALIS, n. sp. (Text-figure 1.)

Female.—Fulvous testaceous, shining, third antennal segment and aristae black. Wings yellowish hyaline.



Text-fig. 1. Apex of wing of *Semisuturia australis*.

Text-fig. 2. Wing of *Amenia imperialis*, male.

Frons at vertex a little less than one-third of the head width, gradually widened to anterior margin where it is about two-fifths of the head width, orbits shining, whitish dusted like the parafacials, upper bristle sloping backward, two forwardly directed bristles on upper half, and about six inwardly curved bristles along inner margin of each orbit; ocellar bristles over twice as long as postvertical pair, divergent and forwardly directed; eye sparsely haired; cheek over one-third of the eye height, the raised part with three or four strong bristles above; several short bristles above vibrissa; arista pubescent; palpi of moderate length. Thorax with 2 + 3 dorsocentrals and 2 + 2 or 3 acrostichals, three humerals, two bristles on presutural area, two pairs of intra-alars, and no bristle between the posterior dorsocentral and postalar bristles; scutellum with 6-8 marginal bristles. First tergite without central apical bristles, second with a

strong pair, third, fourth, and fifth, with practically complete series of apical bristles, and none on disc. Anterodorsal series of bristles on fore tibia quite pronounced; ventral bristle on mid tibia very short and weak; hind femur with one or two bristles before and beyond middle on anteroventral surface. Inner crossvein well before apex of first vein and close to middle of discal cell; apical venation as in Text-fig. 1.

Length, 6.5 mm.

Type, Eidsvold, Queensland, December, 1922.

There are several Oriental species of this genus known to me, none of which I have been able to identify with published descriptions. These will be dealt with in another paper published in England. To establish these species, some of which may occur in Australia, I present below a key to the whole of the species of the genus now before me, reserving the full descriptions for the other paper.

Key to the Species.

1. Bend of fourth wing vein with a quite conspicuous vein emanating from it at the angle, which is quite sharp 2
 Bend of fourth wing vein without any evidence of a vein emanating from it 4
2. Abdominal tergites except first each with a pair of discal macrochaetae in line with the apical central pair; metanotum and abdomen glossy black, basal, and sides of second tergite, yellow *nitidiventris*, n. sp.
 Abdominal tergites except fourth without discal macrochaetae; abdomen not coloured as above 3
3. Third antennal segment black; abdomen glossy brownish black, apex of fourth tergite yellow *nigricornis*, n. sp.
 Antennae entirely yellow; abdomen yellow, brownish apically *flavicornis*, n. sp.
4. Third antennal segment black 5
 Third antennal segment not black, yellow, or at most brownish 6
5. Entire insect except third antennal segment and arista fulvous testaceous
 *australis*, n. sp.
 Thorax with black dorsal vittae, abdomen glossy black on dorsum, apex of fourth visible tergite fulvous *pahangensis*, n. sp.
6. First visible tergite with a pair of macrochaetae on middle of hind margin; outer crossvein, and costa apically, without clouding *hyalipennis*, n. sp.
 First visible tergite without developed macrochaetae on middle of apical margin; outer crossvein, and costa beyond apex of second vein, clouded
 *triangulifera*, n. sp.

I give below the type localities of the new species and the collections in which they are to be found.

SEMISUTURIA NITIDIVENTRIS, n. sp.

Type, Lubok Tamang, Pahang, Federated Malay States, 3,500 feet, June 9, 1923 (H. M. Pendlebury), British Museum.

SEMISUTURIA NIGRICORNIS, n. sp.

Type, Gunong Tahan Padang, Pahang, Federated Malay States, 5,550 feet, January 3, 1923 (H. M. Pendlebury). British Museum.

SEMISUTURIA FLAVICORNIS, n. sp.

Type, Singapore, Straits Settlements (C. F. Baker). Author's collection.

SEMISUTURIA PAHANGENSIS, n. sp.

Type, Gunong Tahan, Pahang, Federated Malay States, 6,000-7,000 feet, December 13, 1921 (H. M. Pendlebury). British Museum.

SEMISUTURIA HYALIPENNIS, n. sp.

Type, Singapore, Straits Settlements (C. F. Baker). Author's collection.

SEMISUTURIA TRIANGULIFERA, n. sp.

Type, allotype, and two paratypes, Cuernos Mts., Negros, Philippine Islands (C. F. Baker). Author's collection.

I have another specimen which appears to belong to a distinct species, from the Federated Malay States, but it is teneral and I do not care to describe it.

Tribe Ameniini.

This group is a difficult one to place satisfactorily. Most authors have placed it in the same group as *Rutilia* Robineau-Desvoidy, but it does not appear to me to be very closely related to that genus. In fact there is a very noticeable difference in the structure of the postscutellum in the two genera I refer here from that of typical tachinids, which *Rutilia* more closely resembles. In Ameniini there is a very much smaller postscutellum than usual in Tachinidae, and, while in the latter group there is always a rounded chitinized portion which bends forward at upper margin, in the group now under consideration the chitin does not noticeably bend forward, and the convexity is therefore much less pronounced. Were the postscutellum totally lacking I might be inclined to refer the genera involved to Calliphoridae, but in the latter the second abdominal sternite always overlaps the lateral margins of the second tergite, while in *Amenia* and *Stilbomyia* it does not. It is noteworthy that the small knob-like process in front of wing base on the pteropleural suture is quite prominent and more like that of a calliphorid than that of a tachinid, the typical forms of the latter group having this knob about on a level with the one immediately below the notopleural suture. A point of distinction between Ameniini and Calliphoridae is that the anterior one of the two outermost bristles on the presutural area is in line with, or mesiad of, the posterior one; in Calliphoridae it is as a rule laterad of it.

A definite conclusion as to the exact location of the Ameniini will depend upon a knowledge of all stages, and pending this information I retain the tribe in the Tachinidae.

Genus AMENIA Robineau-Desvoidy.

This genus contains species of a bright metallic blue or blue-green colour, with conspicuous spots of white dust or tomentum on the thorax and abdomen. The parafacials are bare, the prosternum, centre of propleura, mesonotum below calyptrae, and the hind coxae above bases of femora, are furnished with fine hairs. The centre of the declivous portion of thorax between base of wing and scutellum is furnished with stiff hairs, the suprasquamal ridge is bare, and there are usually four bristles on the presutural area, the anterior one of the posthumeral being almost in line with or mesiad of the posterior one.

Dr. Engel in a recent paper recognized three species as occurring in Australia and gave a diagnosis of their characters, but I do not agree with his conclusions as to the species names. The species he calls *leonina* Fabricius is quite evidently *imperialis* Robineau-Desvoidy. Wiedemann had before him the type specimen of *leonina* when he re-described the species, and his very full and lucid description does not apply at all to the species designated by this name in Engel's paper, but it does apply to that referred to as *stictica* Schiner *in litt.* It is quite clear from an examination of Schiner's description of *parva* and his remarks on *leonina* that

he misidentified the latter, placing *imperialis* and it under the same specific name, and Engel apparently followed suit. I have attempted in this paper to rectify what I consider to be errors of preceding workers, and at the same time separate material before me on the basis of what I take to be specific characters. I have what appear to me to be four species in the material available to me, all of it from the United States National Museum collection, kindly made accessible by Dr. Aldrich of that institution. In the determination of *parva* Schiner there is some doubt, but it appears highly probable that the single specimen which I refer here is correctly named, at least it is the only one which I can reliably distinguish from *leonina*, except the forms without the dorsal thoracic vittae.

Key to the Species.

1. Thorax without evident submedian white dusted dorsal vittae in front of suture; abdomen without trace of white submedian spots on second tergite, only the one on each lateral curve present; frons of male at narrowest point much more than twice as wide as distance across posterior ocelli; presutural acrostichals not noticeably differentiated from the surrounding hairs 2
 Thorax with a pair of very evident white dusted submedian vittae in front of suture 3
2. Ocellar bristles well developed and widely divergent in male, the frons at vertex in same sex five or six times as wide as distance across posterior ocelli *imperialis* Robineau-Desvoidy
 Ocellar bristles almost indistinguishable in male, the frons at vertex in same sex not four times as wide as distance across posterior ocelli *dubitalis*, n. sp.
3. Anterior postsutural dorsocentral bristles of thorax short and weak; postocular orbits very little paler on upper half than below; second abdominal tergite with a pair of submedian whitish dusted spots, sometimes faint *leonina* Fabricius
 Anterior postsutural dorsocentral bristles of thorax well developed and quite strong; postocular orbits silvery white on upper half, contrasting with the yellow dusting of the lower half; second abdominal tergite without submedian white dusted spots, only the usual one at each lateral curve present *parva* Schiner

AMENIA IMPERIALIS Robineau-Desvoidy. (Text-figure 2.)

This species is bright metallic green in colour, with the usual three white spots along each side of thoracic dorsum, and there is a very faint dusting on the anterior portion of thoracic dorsum which, however, is not in the form of vittae and is visible only when seen from behind. There is no submedian pair of white spots on the second abdominal tergite, only the lateral pair being present. The fine hairs on the orbits laterad of the series of fine bristles are yellow in colour.

Structurally this species differs from the next one in having the frons wider, and the submarginal cell of wing more obviously widened at middle than is the case with that species (Text-fig. 2).

Length, 12-13 mm.

Localities: Cairns, N. Queensland (Illingworth), and Buderim Mt., Queensland.

AMENIA DUBITALIS, n. sp.

This species is similar in colour to the above one but is smaller, and differs as indicated in the key to species, and in the above notes on *imperialis*.

It is possible that with a large series of specimens available the distinction will fail and the specimen may really represent only an aberration of *imperialis*.

Length, 10-5 mm.

Type, National Park, Sydney, N.S.W., November 1, 1902 (W. W. Froggatt).

AMENIA LEONINA (Fabricius).

This species is apparently the commonest one of the genus and is readily distinguished by the characters mentioned in the above key. The fourth visible tergite is usually much darker than the others in both sexes which is not the case in any of the other species.

The frons in the male is reduced to a mere line above, and that of the female is about one-fourth of the head width at vertex, becoming wider anteriorly and at the antennae about one-third of the head width, with the interfrontalia always wider than either orbit, and the forwardly directed bristles quite weak.

Length, 9-12 mm.

Localities: Buderim Mt., Qld.; Kuranda, Qld.; Hamilton, Qld.; and Shoalhaven, N.S.W.

AMENIA PARVA Schiner.

The specimen before me to which I assign this name is bright metallic blue-green in colour, and readily distinguished from typical specimens of *leonina*, which are normally deep blue or violet-blue in colour. The white upper portion of the postocular orbits and lack of submedian white spots on second tergite as well as the green colour of the fourth visible tergite, are the outstanding features in the differences in the colour markings between this species and *leonina*, but the second antennal segment is largely fuscous in *parva* and entirely yellow in *leonina*, and while the fuscous cloud in the costal cell of wing ceases quite abruptly a little beyond the humeral crossvein in *leonina* it gradually tapers off apically in *parva*, the entire cell being evidently darkened. The fourth visible tergite is the same colour as the others in *parva*. It is also noteworthy that all the hairs on the head in *parva* are black, while in *leonina* those of the cheeks and occiput are golden yellow. The interfrontalia of female is not wider than either orbit.

Length, 9-5 mm.

Locality: Buderim Mt., Qld.

I give the lengths of the species in accordance with the material before me. It appears pertinent to indicate that Schiner gives the length of *parva* as 2-2.5 lines, which is about 4.25-5 mm., and Engel gives the length of this species as 8-11 mm. As Engel had the type specimens of *parva* before him I accept his statement as correct. It would appear that this genus would furnish an interesting field for investigation to some resident entomologist just as all of the others would, and it may develop that there are more species in Australia than is as yet suspected.

Genus STILBOMYIA Macquart.

This genus is very similar in almost every respect to *Amenia*, and the character cited for their separation by Engel does not hold good for all the species. This character is the length of the third antennal segment as compared with the horizontal diameter of the eye. In *Stilbomyia* the third antennal segment is given as greater than the horizontal diameter of the eye, while in *Amenia* it is stated to be not over three-fourths of that diameter. I find, however, that in a Chinese species of the former the antenna is about as short as in *Amenia*, and in an Australian species the third antennal segment is about equal to the diameter of the eye. The height of the cheek in *Amenia* is always much higher than the entire length of antenna, whereas in *Stilbomyia* it is not as high except in the Chinese species already referred to where the two are nearly equal. The frons

of the males of *Amenia* is very much narrower than in the females, and never has strong forwardly directed bristles on the upper half on the outside, while in the males of *Stilbomyia* the frons of the male is as wide as it is in the female, and in both sexes there are at least two strong forwardly directed outer bristles on the upper half; the females of *Amenia* have such forwardly directed bristles but they are much weaker than in *Stilbomyia*. In both genera the abdominal sternites are widely visible between the tergites apically, the exposed surface narrowing considerably from apex to base.

Engel does not record this genus from Australia though he gives one species as occurring in New Guinea. I have before me one specimen belonging to the United States National Museum which is referable here.

STILBOMYIA OPULENTA (Walker).

This species may be the same as *costalis* (Walker), placed in the genus by Engel, but the face is only slightly browned in the antennal fovea, not dark brown, and there is a silvery dusted spot on the mesopleura, not on the sternopleura as stated by Engel for *costalis*. *S. costalis* is the species recorded by Engel from New Guinea.

Locality: Kuranda, Qld. (F. P. Dodd).

I accept the identification on the specimen as correct.

Tribe Rutiliini.

Brauer and von Bergenstamm used the name Rutiliidae for a group which included only the genus *Rutilia* Robineau-Desvoidy. In a recent paper Dr. Engel has dealt with "Rutiliidae *sensu lat.*", including in his treatment 11 genera, and amongst them *Amenia* and *Stilbomyia*.

I consider the group dealt with by Engel to be heterogeneous, but several of the genera he included are unknown to me at this time so that it is not possible for me to allocate them definitely.

Townsend in 1916 designated *vivipara* (Fabricius) Robineau-Desvoidy as the genotype of *Rutilia*. Engel cited *desvoidyi* Guerin as the genotype in his paper and gave as the same species *vivipara* Robineau-Desvoidy. I consider these species distinct, and as *desvoidyi* was not originally included it can not be accepted as the genotype even if it were the same as *vivipara*, which I cannot admit is possible. In the following pages I discuss the identity of these species.

In the collection of the United States National Museum there are several species which are referable to *Rutilia*, and from an examination of these I have drawn the following as evident generic characters: Suprasquamal ridge with numerous long hairs, often curled and very conspicuous; centre of declivous area above these hairs bare; face with a broad central vertical carina; arista pubescent; abdominal sternites covered by the lateral margins of the tergites, sometimes narrowly visible at apices; third and fourth visible tergites each with apical central bristles, except sometimes the fourth in the male, and rarely the second with a few shorter stout central apical bristles. In most of the Rutiliini before me there is a very evident vein-like linear weak mark between the fifth and sixth wing veins which simulates a vein, but this is not confined to this group and recurs in Dexiinae of various groups.

My deductions as to specific characters hereinafter given are predicated upon an examination of the species in the United States National Museum, no material having been received by me from Australia direct. As is only to be expected in

the case of such large, and usually brilliantly coloured, species there have been many descriptions placed on record, and unfortunately it is very difficult to decide definitely just how many valid species there are, and also to decide what species are intended by certain of the descriptions. An extensive collection of the group will undoubtedly provide a basis for a decision as to the number of species involved, but only an examination of the type specimens will definitely decide the exact specific names applicable to each, and when the type specimens are scattered as in this case the work is too great to be undertaken by any one individual.

RUTILIA VIVIPARA (Fabricius).

In the United States National Museum collection there is a specimen labelled by Coquillett as this species. I have carefully gone over the specimen with the original description and believe that there is a great probability that it is correctly named. Wiedemann did not see the type specimen of this Fabrician species and I do not know if it is in existence. There are, however, two other specimens mentioned below which appear to confuse the issue somewhat and it will require careful work by someone on the ground to discover to what extent, if any, the species varies in the characters mentioned below.

The specimen bearing Coquillett's label has the following characters: Hind margin of the mesonotum with 4-6 strong bristles; prescutellar and presutural acrostichal bristles well developed, 4 + 3-4 pairs; scutellum slightly convex, with about 14 marginal bristles and a number of short but evident discals; supra-squamal ridge with a few distinct hairs; second abdominal tergite with six short stout central apical bristles; parafacials haired only on upper part to about apex of second antennal segment; both spiracular coverings testaceous; submedian thoracic vittae divergent behind, not continued much beyond suture; prosternum and centre of propleura haired; anterodorsal bristles on hind tibiae irregular in female.

Locality: Leura, N.S.W. (W. W. Froggatt). One female.

One specimen from Mittagong has two bristles on middle of apical margin of second abdominal tergite, and has no presutural acrostichals, and two or three pairs of prescutellars. The suprasquamal ridge is more pronouncedly haired than in the above one.

Another specimen has no bristles on second abdominal tergite, but is very similar to the preceding specimen in other respects.

It appears to be pertinent to note here that the presence of bristles on the central apical portion of second abdominal tergite has been accepted as important in distinguishing genera in this group, and if it is a variable character, which is not at all unlikely, from an examination of the above three specimens, its value is much less than indicated by Engel. Of course there may be more than one species in the material before me, but it is impossible to be certain of this without access to a larger series of specimens, and in better condition than those now available.

RUTILIA DESVOIDYI Guérin.

Specimens accepted as this species by Townsend possess the following characters: Parafacials haired to lowest margin of eyes; mesonotum with 4-6 hind marginal bristles; only prescutellar acrostichal bristles present; no pronounced discal bristles on scutellum, and 8-10 marginals, the disc subconvex; no distinct

bristles on apical margin centrally of second tergite; male with the series of bristles on antero-dorsal surface of hind tibia quite regular and close; in other respects as the two last mentioned specimens of the preceding species.

Mittagong, N.S.W. (W. W. Froggatt); two males with label Australia only.

This species is decidedly more metallic green tinged on dorsum than is the one accepted as *vivipara*.

RUTILIA INORNATA Guerin.

This species is usually much darker in colour than *vivipara*, being black, or fuscous, with black legs, fuscous calyptrae, a dark mark near bases of wings, and the dorsum of thorax and abdomen more or less bluish or violet coloured, especially noticeable on the scutellum and abdomen.

The hind margin of mesonotum has a transverse series of 8-10 strong bristles, the outer one on each side being the posterior dorsocentral; the scutellum is flattened above, slightly angulate at apex in middle, and has about 14 strong evenly spaced bristles, and no outstanding discals. The second abdominal tergite has no central apical bristles, and the suprasquamal ridge is densely long haired; while the parafacials are haired only to about apex of second antennal segment.

Locality: Queensland.

RUTILIA SPLENDIDA Donovan.

A brilliant metallic green or blue-green species. Head orange-yellow, upper occiput green, the postocular orbits white dusted above; hairs on cheeks yellow. Thoracic dorsum with four narrow black vittae, conspicuously white dusted between the anterior portions of the vittae, on humeri, two lateral presutural spots, and on an elongate spot above wing base; scutellum blue-green; mesopleura with a large white dusted spot; pleural hairs black. Abdomen with a broad black-blue dorsocentral vitta, and an apical fascia on second and third visible tergites of same colour which widens out about midway to lateral curve, and usually connects with a narrower basal fascia at that point leaving a large submedian spot of green on each side of each tergite. Legs black. Bases of wings blackened to apices of basal cells except for the usual central hyaline spot. Calyptrae whitish at bases, brown beyond.

Frontal lunule with some hairs; parafacials haired to below middle of eyes; mesonotum with four or six posterior marginal bristles, the presutural acrostichals small, but usually quite evident; postalar callosity with 4-5 bristles; sternopleurals 2-3 + 1; scutellum slightly convex, with about 12 marginal bristles, and some short bristles along edge of disc. Bristles at apices of third and fourth tergites not very long. Anterodorsal fringe on hind tibia quite regular in both sexes.

Locality: Cairns, N. Qld.

RUTILIA FORMOSA Robineau-Desvoidy.

A brilliant metallic coloured species. The thorax is usually pale blue-green, with a slightly opalescent shade because of the presence of pale dusting, and the abdomen is more emerald green, with a coppery tinge. The dorsum of thorax has two faintly indicated dark submedian vittae anteriorly which are divergent behind, and there are no distinct white spots present. The abdomen has a blue-black dorsocentral vitta, and on apices of second and third visible tergites a rather broad fascia of same colour which becomes obsolete at the lateral curve, and is not present below. Head orange-yellow, frontal orbits and parafacials paler,

becoming whitish along eyes, the orbits green at upper extremities; occiput and the raised part of cheeks pale green, white dusted, postocular orbits white dusted; occipital and genal hairs yellow. Legs black. Wings black near bases. The fine thoracic hairs yellow.

Thoracic bristling as in *splendida*. Parafacials haired to, or almost to, lowest level of eyes.

Localities: Townsville and Cairns, North Qld.

A female specimen from Shoalhaven has the third antennal segment black except at base, but is otherwise the same as the above specimens.

A specimen from the old Fitch collection in the United States National Museum, named by Bigot, agrees with the description given above.

In addition to the above-mentioned specimens I have one from New Guinea, sent to me by Dr. Karny, which has the thoracic and cephalic hairs black, and the basal dark mark on the wings very faint; and another female, from China, belonging to the U.S. National Museum, which agrees very well with the one from New Guinea, except that the hairs on occiput are yellow, except those on margins above.

These variations may represent distinct species, but I have no males.

I have carefully examined the two specimens in the United States National Museum that were accepted as *formosa* by Townsend, and used as a basis for his genus *Chrysorutilia*. These are larger and more robust than the specimens dealt with above, and are darker in colour, with the genae much less conspicuously green, and the face below carina, and the third antennal segment entirely fuscous. In addition to these characters the female has a quite conspicuous apical central depression on the fourth visible tergite as in typical species of *Rutilia*, which is not the case in the other females before me.

In my opinion *Chrysorutilia* is not a good genus, and the genotype is not correctly identified if Engel's identification is correct, the latter being the form with the yellow thoracic hairs first listed in this paper.

I have examined several additional species of *Rutilia* in the United States National Museum collection, but at the time of writing cannot be absolutely certain of the specific identity of any of them except the following two, so leave them aside temporarily.

RUTILIA ERICHSONI Engel.

Head yellowish fulvous, occiput and raised part of cheek brassy green, occiput, genae, and parafacials, yellow haired. Thorax violet-black, with black hairs and the following bluish or greenish silvery marks: Two presutural submedian dorsal vittae, four spots on each lateral margin of mesonotum, the middle pair one above the other, and a spot on mesopleura. Abdomen coloured as thorax, second and third visible tergites each with an anterior marginal, metallic green, or blue-green, centrally interrupted, fascia, fourth tergite with a black central spot on anterior margin, the remainder of surface metallic coppery green. Wings dark at bases. Calyptrae yellowish white.

Parafacials haired to lowest level of eyes. Scutellum convex, with eight marginal, and some short discal, bristles. Second tergite of abdomen with a pair of short apical central bristles, fourth tergite weakly bristled, not concave at apex.

Length, 13 mm.

Locality: Waroona, W.A., 25 Jan., 1909 (G. F. Berthoud).

RUTILIA ARGENTIFERA Bigot.

Head as in *erichsoni*. Thorax violet-black, posteriorly and on scutellum markedly more bluish, the presutural pair of vittae vestigial and narrow, each lateral margin of mesonotum in the specimen before me with but two bluish white marks, and the mesopleura with one. Abdomen violet-black, second and third tergites each with four round greenish or bluish silvery spots, fourth with a large silvery white spot on each side. Wings blackened at bases. Lower calypter browned apically. Thoracic hairs black.

Structurally similar to *erichsoni*.

Length, 13 mm.

Locality: Cairns, North Qld.

There are a few slight discrepancies between the above descriptions and that of this species given by Engel, but they are not important enough to justify a belief that they do not belong to the same species.

I present below a key to the foregoing species.

Key to the Species.

1. Parafacials not haired below middle of eyes; species not bright metallic green nor blue-green 2
 Parafacials haired to below middle, often to lowest level of eyes; if only to middle the species is largely metallic green 3
2. Hind margin of mesonotum with 4-6 strong bristles; scutellum subconvex
 *vivipara* (Fabricius)
 Hind margin of mesonotum with 8-10 strong bristles; scutellum flattened on disc
 *inornata* Guérin.
3. Thorax fuscous, with slight greenish or bluish metallic tinge, and no conspicuous white markings on either it or abdomen
 *desvoidyi* Guérin.
 Thorax either brilliant metallic green or blue-green, if black then with conspicuous white markings, and with white or green markings on abdomen 4
4. Thorax brilliant metallic emerald green, without white markings .. *formosa* Rob.-Desv.
 Thorax either metallic blue-green, or black, with metallic reflections, and always with conspicuous white markings 5
5. Thorax and abdomen brilliant metallic blue-green, the former with four narrow blackish vittae anteriorly and between these the ground colour is quite conspicuously obscured by white dusting, lateral margins of mesonotum each with four white spots, the median pair one above the other; abdomen with black basal and apical fasciae on second and third tergites which are usually connected midway from the central black vitta to lateral curve so as to leave two large green spots on each side of each of the tergites
 *splendida* Donovan.
 Thorax and abdomen violet-black 6
6. Abdominal tergites 2 and 3 each with four rather small round bluish, or greenish, silvery spots on disc, the fourth with two larger white spots .. *argentifera* Bigot.
 Sides of first tergite, and anterior margins of second and third on sides, broadly metallic green, fourth tergite metallic green, with a central black spot on anterior margin
 *erichsoni* Engel.

N.B.—This key should be used carefully in connection with the foregoing notes on the included species to prevent errors in identification.

Genus AMPHIBOLIA Macquart.

This genus is similar to *Rutilia* in having the suprasquamal ridge haired, and the declivity above these hairs bare. The specimen of the genotype, *valentina* Macquart, which I have examined, has the second and third visible tergites of abdomen each with two small bristles near anterior margin in centre, and some others near apex in centre. The parafacials are bare below middle, and there are but three strong bristles on the postalar callosity.

I have seen only one species referable here, the other one included by Engel, *speciosa* Erichson, being a species of *Formosia*.

Genus FORMOSIA Guerin.

This genus as included in Engel's paper may be heterogeneous, but my definition of it is based upon *mirabilis* Guerin and *flavipennis* Macquart, the former being the genotype. It is distinguished from *Rutilia* by the lack of hairs on the suprasquamal ridge, and the presence of long hairs on centre of the postalar declivity. The arista is also often much more distinctly haired, the posterior margin of mesonotum and of second abdominal tergite in centre are more strongly bristled as a rule; and the prosternum is bare, while the centre of the propleura is haired. In addition to these characters the species before me all have a series of very prominent erect spines on the apical margin of the tergites below, and the parafacials bare below bases of antennae. The colour of the parafacials cited by Engel as a distinguishing character of the genus is valueless, in my opinion, though it appears to distinguish the two groups here included, those with the distinctly haired aristae having a green colour while those with the pubescent aristae have no green colour present on the parafacials.

FORMOSIA FLAVIPENNIS Macquart.

This species differs from its congeners of metallic green colour in having the legs fulvous yellow, only the apices of the tarsi being infuscated, and the pleural hairs entirely yellow. The thorax is emerald green, with the sutures fulvous yellow, and dorsum faintly quadrivittate anteriorly; the head is fulvous yellow, with occiput, frontal orbits, and the greater part of parafacials and cheeks, opalescent green. Abdomen fulvous, first tergite above, and apices of other tergites black, disc of second tergite and sides of third and fourth, coppery red, disc of third and fourth tergites largely blue, sides of second green. Wings yellow at bases, not darkened; calyptrae and halteres yellow.

Arista with the longest hairs about as long as width of third antennal segment. Only the posterior dorsocentral bristles present; sternopleural 1; scutellum flattened above, broadly subtriangular, with about 14 irregular marginal bristles.

Locality: Cape York, N. Qld.

FORMOSIA MIRABILIS Guerin.

This species, as identified by Townsend in the United States National Museum, is very similar to *flavipennis*, but the legs are fuscous, and the hairs on mesopleura are black. The thoracic dorsum has four quite distinct black vittae on the metallic emerald-green ground colour. The abdomen is coppery green, black on first tergite, a median vitta on all tergites which is wider behind, the apices of all tergites, with a large spot-like enlargement on each side of each tergite, the black apical margin continued below, and becoming rather abruptly linear near lateral margin. Wings hardly darkened at bases. Calyptrae brownish yellow.

Eyes of male separated by not over the width of third antennal segment; arista rather long haired.

Locality: Aru Island.

This specimen looks like a dark example of *flavipennis*, but may be distinct. The apex of abdomen is paler than in the above female, instead of darker which one would expect to be the case if they are the same species.

FORMOSIA ATRIBASIS (Walker).

This species was included in *Rutilia* by Engel, but apart from the pubescent arista there is no character of any import that one can use for its separation from *Formosia* as herein accepted.

It is readily separated from the preceding two by the fuscous head, which has dense whitish dust everywhere except on the interfrontalia, instead of being green, the black thorax, which is greenish tinged and quadrivittate on dorsum, the presutural portion being quite distinctly white dusted, and has a large white dusted mark on the mesopleura. The abdomen is black, with second tergite green, conspicuously reddish coppery tinged, and with a large transverse black mark at bases of the apical central bristles, third tergite coppery green on anterior margin each side of the black central mark. Legs, bases of wings to apices of basal cells, and the calyptrae, deep black.

Arista pubescent. Dorsocentrals 3 + 5, the anterior two pairs of postsuturals weak, presutural acrostichals weak but evident; scutellum subconvex; sternopleurals 1 + 1, anterior one weak.

Locality: Kuranda, Qld. (F. P. Dodd).

FORMOSIA SPECIOSA (Erichson).

This species agrees with *atribasis* in having the arista merely pubescent, but differs markedly in colour, entirely lacking metallic tinge, being entirely black, with markings of dense greyish white dust on thorax and abdomen. Head testaceous, frons and upper occiput fuscous, all except the interfrontalia densely grey dusted; third antennal segment blackish except at base; palpi testaceous yellow. Thorax opaque black, with the following white dusted marks: four vittae and a small anterior central mark in front of suture, four spots behind suture, a spot on mesopleura and another on sternopleura. Abdomen densely whitish grey dusted, black on the following parts: first tergite, a transverse spot near apex of second tergite in centre, a cordate central spot and a much larger one on each lateral curve of third tergite, all of which connect with larger spots on fourth, and a spot on extreme lateral margin of each tergite below. Legs fulvous yellow. Wings slightly infuscated at bases. Pleural hairs yellow.

Thoracic bristling as in *atribasis*, but the presutural acrostichals lacking.

Locality: Wickham, N.S.W.

This is the genotype of *Euamphibola* Townsend, but I do not consider it entitled to generic separation from *Formosia*, the only character distinguishing it being the pubescent arista. It may ultimately be accorded subgeneric rank with *atribasis*. I have seen several other species that would also fall in the group, but cannot now identify them.

Genus PRODIAPHANIA Townsend.

This genus is distinguished from all three of this tribe previously dealt with in this paper by the absence of hairs on the suprasquamal ridge and postalar declivity. Other distinguishing characters lie in the extremely small palpi, all of the others having these organs long and slender, and the long narrow upper calypter, which is as long as the lower one and has some small black hairs invading the disc basally on the outer half. The arista is long haired, and the postalar bristles normally four in number. The conspicuously explanate costa is not confined to this genus, as I have before me a species of *Rutilia* which very closely resembles in superficial appearance the only known species of *Prodiaphania*, and has the same costal character.

Prodiaphania has the prosternum bare and the propleura haired in centre, and except for the peculiar upper calypter is closely similar to some genera of Dexiinae. I had thought it might be possible to use this lengthening of the upper

calypter as a group character, as it is evident in *Rutilia* and *Formosia*, but it is not so marked in either of these genera, and is slightly variable in the different species.

The only species of *Prodiaphania* is *testacea* Macquart, which I have seen from Cairns, North Queensland.

Of the other genera dealt with by Engel I have not seen the following: *Paramenia* Brauer and von Bergenstamm; *Microtropeza* Macquart, *Chrysopasta* Brauer and von Bergenstamm, *Senostoma* Macquart, and *Paramphibola* Brauer and von Bergenstamm.

Judging from the descriptions the first two do not fall within the group as accepted in the present paper, having no facial carina, and without an examination of the others it is impossible for me to indicate their relationships.

In the United States National Museum there are several genera placed in this group by Townsend which were not mentioned by Engel, and some of these are properly referable here, though one or two are not. I have already referred to *Chrysorutilia* and *Euamphibolia*, and below deal with some of the other genera which may be considered as referable to the group or in its immediate vicinity. I do not guarantee the correctness of the specific identifications given, as that must await type examination.

Genus GRAPHOLOSTYLUM Macquart.

I have not seen *dorsomaculatum* Macquart the type species of this genus, but in the United States National Museum there is a specimen identified by Townsend as *decorum* Guerin which is placed in this genus. This specimen agrees with one other so named by Bigot in the same collection. Engel places *decora* as a synonym of *splendida* Donovan, but the two specimens before me are quite different in the colour and markings of the abdomen from the series identified as *splendida*. The general colour of the abdomen is a deep bluish black, on the disc of tergites 2 and 3 there is a pair of small round green spots, on the lateral curves of tergites 1 to 3 there is a larger transverse green mark, and on each side of fourth tergite there is a large green mark, the margins of all of these markings suffused with Prussian blue colour.

Parafacials haired to lowest level of eyes.

Locality: Sydney, N.S.W.

This species is a genuine *Rutilia*, but *dorsomaculatum* may not be.

In the key to the species of *Rutilia* given on a previous page in this paper the present species will run down to *splendida*, but the smaller size of the dorsal spots on abdomen, and the greater proportion of the parafacials which is haired will readily distinguish the two forms, which may not be distinct species but only varieties of one.

Genus RUTILODEXIA Townsend.

This genus is doubtfully referable to this group. The face in profile is more protuberant than in *Rutilia*; postalar declivity, suprasquamal ridge, and prosternum bare; centre of propleura with hairs; parafacials bare below bases of antennae; arista pubescent. Calyptrae as in typical Dexiinae. Postalar bristles 4-5. Abdomen as in *Rutilia*, with no discal bristles except on fourth tergite. The genotype is identified as *angustipennis* Walker.

Genus CHAETOGASTER Macquart.

This genus is similar to the preceding one, but has quite distinct presutural acrostichal bristles on thorax, and the abdominal tergites 2-4 have each one or more pairs of quite strong discal bristles. Facial carina not so prominent. Genotype, *violacea* Macquart.

Occurs in Victoria and New South Wales.

Genus CHLOROTACHINA Townsend.

This genus has no facial carina and does not come within the scope of the group as accepted herein. It would run to *Microtropeza* Macquart in Engel's key to the genera if one cared to consider it as belonging to "*Rutiliidae sensu lat.*", but the third antennal segment is much longer than the second, and the insect is a bright metallic blue-green in colour, two characters which exclude it from Engel's concept. The genotype is *flaviceps* Macquart.

Locality: Cairns, North Qld.
